Car Cleaning and Detailing

Need to Know

- Cars get dirty. Exteriors collect dirt, pollen, tar, sap, bird droppings, and chemicals from acid rain and hard water. Interiors acquire dirt, stains, odors, scuff marks and other wear during normal use.
- Keeping a car clean not only makes it look better and adds to pride of ownership, it extends vehicle life and helps maximize resale or trade-in value.
- Depending on climate and usage, cars should be washed every one to three weeks, and waxed two to four times a year.
- Cleaning tools such as wash mitts, sponges, towels and brushes should be made of soft materials that will not scratch the paint or other surfaces.
- Cleaning products should be specifically designed for automobiles; household cleaners often contain ingredients that can damage the vehicle finish and other parts.
- Exterior cleaning involves washing, drying, and waxing. Interior cleaning involves vacuuming, dusting and stain removal. Both involve applying protective treatments to various surfaces.
- Exterior and interior detailing takes car cleaning to a higher level and involves numerous additional steps, depending on the condition of the vehicle and the desired end result.

Regular care keeps a vehicle looking good, extends its lifespan and improves resale value. *Image: iStockphoto.com/ Cathy Yeulet*

Table of Contents

Page / Link

2 Overview
2 Cleaning Products
3 Cleaning Tools
4 Underhood Cleaning
5 Underbody Cleaning
5 Wheel and Tire Cleaning
6 Exterior Cleaning
10 Paint Restoration and Protection
12 Body Trim Care
12 Body Repair and Protection
14 Interior Cleaning
17 Glass Cleaning
20 To Learn More

What is an ATU?

AAA Automotive Technology Updates (ATUs) provide expert information on a variety of topics related to modern vehicles. Some feature in-depth answers to common questions about automobile use and maintenance. Others explore new technologies in today's rapidly evolving automobiles. For additional information, visit www.AAA.com/autorepair.

© 2016 American Automobile Association, Inc

Overview

Car exteriors seem to be magnets for dirt, road tar, tree sap, bird droppings and other contaminants. Rain won't wash these substances away, and may contain acids that can further damage the paint. Extended exposure to heat and ultraviolet rays from the sun can also be a problem, causing a car's finish to oxidize and fade.

Sun exposure harms vehicle interiors as well, and day-to-day use has other damaging side effects. These can range from dirt and moisture in the carpeting, to food spills and other debris that leave stains and work their way into upholstery seams where they cause wear. Stale food particles can also combine with dust, pollen, smoke, vinyl vapors and other contaminants to create unpleasant odors, and deposits on interior surfaces and glass.

Keeping a vehicle clean makes it more attractive and pleasant to drive, but there are practical reasons for cosmetic car care as well. A vehicle that is regularly cleaned and detailed will last longer and retain more of its original value when it comes time to sell or trade it in.[1] Also, promptly addressing issues such as door dings and minor paint scratches or chips can help prevent rust and corrosion.

A vehicle that is regularly cleaned and detailed will last longer and retain more of its original value when it comes time to sell or trade it in.

Basic car cleaning, as done by most vehicle owners or local car washes, consists of exterior washing and waxing, interior vacuuming and dusting, glass cleaning, and the application of selected protective products. AAA recommends washing a car every one to three weeks and waxing it two to four times a year. Intervals vary with how often a vehicle is driven, road conditions, weather, and other factors.

Detailing is car cleaning taken to a higher level. It is often performed by professionals with specialized tools, cleaners and protectorants, but dedicated do-it-yourselfers can also handle many of the tasks. In detailing, the exterior finish may undergo several levels of treatment to remove deposits, minimize imperfections, and provide long-lasting protection against the elements. Metal trim is polished, and rubber and plastic parts are treated to restore and preserve their appearance. Inside the car, carpets and upholstery are shampooed or cleaned. Dust, dirt and deposits are removed from other surfaces, which are then treated with products that restore their finishes and protect against wear and tear.

The sections that follow provide information on automotive cleaning and detailing. For hard-core car enthusiasts, links to numerous professional detailing guides are provided in the "Learn More" section at the end of this paper.

A kit of exterior and interior car cleaning and detailing products. *Image: Meguiar's*

Cleaning Products

There are many suppliers of automotive cleaning and detailing products, including 3M, Armor All, Eagle 1, Griot's Garage, Meguiar's, Mother's, Simoniz, Turtle Wax and more. These companies sell extensive families of products that can be purchased individually or in sets that include a selection of the most commonly used solutions. Consumer products are available at auto parts and other stores, and many of the major suppliers offer a second line of commercial products that are sold primarily to professional detailers.

There are also numerous smaller companies that sell specialty car care products directed toward high-end and classic/collector car owners. Most of these "boutique" brands are sold online directly from the manufacturer or through sites that cater to professional detailers and auto enthusiasts.

© 2016 American Automobile Association, Inc

The prices of cleaning and detailing supplies can range from a few dollars for individual products to hundreds of dollars for comprehensive high-end professional packages. Some car owners mix and match products from different manufacturers, but professional detailers often use a single line of supplies to ensure compatibility and consistent results.

It is not necessary to spend a lot of money on cleaning and detailing supplies, but it is very important to read labels and fully understand the intended use of each product. Many solutions are designed for use only on specific materials or finishes, and can cause damage to others. Owner's manuals are a good source of information on the automaker's recommended cleaners for a specific vehicle.

Before using any cleaner or protectorant, read the packaging carefully and pay particular attention to the instructions and any cautions or warnings. The initial application of a product should always be a test performed in a concealed area of the surface being treated to makes sure no discoloration or other damage occurs.

The prices of cleaning and detailing supplies can range from a few dollars for individual products to hundreds of dollars for comprehensive high-end professional packages.

Cleaning Tools

Car cleaning and detailing involves the application and removal of various solutions throughout the vehicle. Common application and removal supplies include wash mitts, sponges, brushes, towels, squeegees, dusters, foam applicators, buffing pads and more. The appropriate tools will vary with the part and the process involved.

There are three key rules when it comes to car cleaning tools. First, only use tools made of materials that will not scratch the surface being cleaned. Second, rinse or swap out dirty tools for clean ones frequently during the cleaning process. And finally, clean the tools thoroughly when done; brushes should be thoroughly rinsed, and tools made of fabric can be run through a washing machine.

Car cleaning has traditionally been done using mitts and towels made of 100 percent cotton, or wool in the case of some wash mitts. These tools remain common, but newer versions made of microfiber fabric are increasingly popular due to their superior absorbency and contaminant removal properties. When power buffers (see below) are used on vehicle exteriors, foam pads are commonly employed to apply compounds, polishes and waxes, which are then removed with soft wool or cotton bonnets.

Cotton and microfiber wash mitts and towels should always be laundered separately because cotton fibers easily become trapped in microfiber and are troublesome to remove. In addition, fabric softener liquids and dryer sheets should be avoided with both materials because they reduce absorbency and leave contaminants in the fabric that can be deposited on the vehicle finish.

A selection of car cleaning tools. *Image: Wolfgang Car Care*

Pressure Washers and Garden Hoses

Professional detailers generally discourage the use of pressure washers to clean any part of a car. The high-pressure water stream can damage door seals, force water and contaminants into places they should not be, and drive dirt into and across the paint causing scratches and other damage. The unrestricted flood of water from an open garden hose, or a soft spray from a hose nozzle, is sufficient to remove loose contaminants and wash away detergents without causing damage. A nozzle with a quick shut-off valve will help conserve water when the hose is not in use.

© 2016 American Automobile Association, Inc

Power Buffers

Many vehicle owners apply and remove vehicle polishes and waxes by hand, but a power buffer can make these tasks easier. Professional detailers use rotary buffers with powerful motors that spin an applicator or buffing pad in a circular motion. These tools are very effective, but if used improperly can leave swirl marks, burn the vehicle finish or cut through the paint — particularly on body panel edges and other areas where there are sharp bends or creases in the surface.

A rotary car polisher (left) and a random-orbital unit (right). *Images: Makita and Griot's Garage*

A better option for the average person is a random orbital polisher, which rotates the pad in multiple small circles within a larger circle that also rotates. While this buffer design is not well suited for major finish restoration, it is very effective for normal cleaning and polishing, and is far less likely to damage the vehicle paint than a rotary buffer.[2]

For best results with any power buffer, always carefully read the instruction manual before using the tool on a vehicle's finish. Online instructional videos from buffer suppliers and detailing experts are also good sources of information on the proper techniques and precautions when using these tools.

Underhood Cleaning

A clean engine makes it easier to identify any leaks, and is more attractive to potential buyers when the car is being sold. Pressure washing and steam cleaning used to be common underhood cleaning procedures, but those methods are discouraged today because modern engine compartments are filled with fuse boxes, electrical connectors and electronic components that can be contaminated or otherwise damaged by high-pressure water or steam.

Engine cleaning and protectorant kit for underhood care. *Image: Griot's Garage*

If an engine compartment is mainly soiled with dirt and dust, a bio-degradable, water-based cleaner can be used for cleaning. Start by removing leaves and other loose debris and, if necessary, use a plastic scraper to remove accumulated soil and leaf "mulch" deposits. Next, make sure all electrical connectors are fully fastened, and then cover fuse boxes, electronic components and other sensitive parts with plastic bags. Apply the cleaner and allow it to soak for a time. Brushes and plastic scrapers can be used if needed to help remove deposits. Finish by rinsing the underhood area with a flood or soft spray of water from a garden hose. Alternately, dirty areas and components can be sprayed with cleaner and then wiped clean with towels.

Engine compartments with extensive oil and grease deposits will require more powerful petroleum-based cleaners. These solutions contain toxic chemicals and generate oily residue that is considered hazardous waste. It should never be washed onto the ground or into a drain that is not equipped with an oil-water separator. Unless any oily waste from engine compartment cleaning can be captured and disposed of properly, the job should be left to a professional detailing facility.

© 2016 American Automobile Association, Inc

Once the engine compartment is clean and all components have dried, an engine dressing solution can be applied following the supplier's instructions. These products enhance appearance and protect plastic and rubber parts. Some also provide a coating that helps keep contaminants from adhering to underhood surfaces, which makes cleaning easier the next time around.

Underbody Cleaning

Removing dirt and other deposits from inside wheel wells and under the car helps prevent rust and corrosion. This is particularly true on vehicles driven off road, in muddy conditions, or where salt and other chemicals are used to melt ice and snow.

An automatic car wash with undercarriage spray nozzles.
Image: Wash Me Car Washes

Many automated car washes offer an undercarriage wash option, and special undercar spray tools that attach to a garden hose are also available for this purpose. The insides of wheel wells can usually be cleaned with spray from a garden hose nozzle. If a detergent is used, experts have found low-pH solutions generally work best to loosen, dissolve and neutralize newer road salts and other deposits. Care should be taken not to use excessive water pressure when cleaning the undercarriage as this can force deposits into small cracks and crevices where they may contribute to rust and corrosion.

Wheel and Tire Cleaning

Wheels, tires and the wheel wells that surround them are often the dirtiest parts of a car. As a result, most professional detailers recommend that they be cleaned first with dedicated tools when washing a car. This prevents grit, grime and any wheel cleaning chemicals from being accidentally splashed onto a freshly washed car finish. It also minimizes the time rinse water is left on paint where it can begin to dry and leave spots if the tires and wheels are cleaned last.

Wheels, tires and the wheel wells that surround them are often the dirtiest parts of a car. As a result, most professional detailers recommend that they be cleaned first with dedicated tools when washing a car.

Common wheel and tire contaminants include dirt, mud, ice and snow melting chemicals, and brake dust — which can be particularly difficult to remove if left in place too long. Sponges and wash mitts work well to clean wheel and tire surfaces, while soft bristle brushes can be used to remove tougher deposits and scrub harder-to-reach areas such as between wheel spokes. Once finished, use a hose and nozzle to rinse clean the wheel wells and tire/wheel assembly.

Most wheels and tires can be cleaned with a car wash detergent solution, but wheels with heavy or stubborn deposits may require a special cleaner. Use extra care when selecting these type products. Modern wheels and lug nuts can be made of steel, aluminum or other light alloys — and may have painted, polished, chromed, machined, anodized, powder-coated or clear-coat finishes. Center caps and hub caps are frequently made of plastic. A cleaning solution that works well for one type of wheel can permanently damage another, and even the correct product may cause problems if left on the wheel too long. Read the label to ensure compatibility, and follow the directions carefully to ensure optimum results. If in doubt, consult the owner's manual for the automaker's wheel cleaning recommendations.

© 2016 American Automobile Association, Inc

Once the tires are dry, treat the sidewalls with tire dressing to enhance appearance and protect the rubber against ozone and ultraviolet light. Professional detailers recommend water-based solutions that contain natural oils and synthetic polymers that leave a dry, satin finish. Silicone-based products that produce a wet, shiny finish may contain petroleum distillates that will break down tire rubber and cause premature drying and cracking.

Polishing or waxing the wheels will restore and maintain their appearance, and can help keep brake dust from adhering to the surface. As with wheel cleaners, the appropriate polish or wax varies with the wheel finish. Read product labels carefully and consult the vehicle owner's manual for automaker recommendations.

Use care when cleaning alloy wheels; this rim has both painted and machined surfaces protected by an overall clear coat. *Image: iStockphoto.com/Kim Reinick*

Wheel Refinishing and Repair

Steel wheels with minor damage can be professionally straightened and repainted, although it is often cheaper to simply replace them. Alloy wheels, on the other hand, can be very expensive to replace so those that are badly weathered or have "curb rash" and other cosmetic defects can be reconditioned to a like-new appearance by companies that specialize in such work.

Bent or cracked alloy wheels are another matter altogether, and opinions vary widely on whether they can be safely straightened and repaired. Even companies that do this work say not every wheel is a viable candidate. When considering alloy wheel repair, seek expert advice from companies that have a thorough understanding of alloy wheel metallurgy, and are able to provide the appropriate repair processes necessary to ensure a safe result.[3]

Depending on the work needed, alloy wheel repair and refinishing typically costs between $75 and $200.[4] However, the job can cost significantly more if the wheel is rare or requires special work — circumstances that often apply to collector cars where replacement wheels may be unavailable.

Exterior Cleaning

With proper care, it is possible to keep a vehicle's exterior looking at least as good as the day it rolled off the assembly line, and sometimes even better. Basic exterior cleaning involves a simple wash and wax, but depending on the condition of the vehicle finish, and the desired final outcome, exterior car cleaning can be a far more involved process as shown in the accompanying flow chart.

With proper care, it is possible to keep a vehicle's exterior looking at least as good as the day it rolled off the assembly line, and sometimes even better.

© 2016 American Automobile Association, Inc

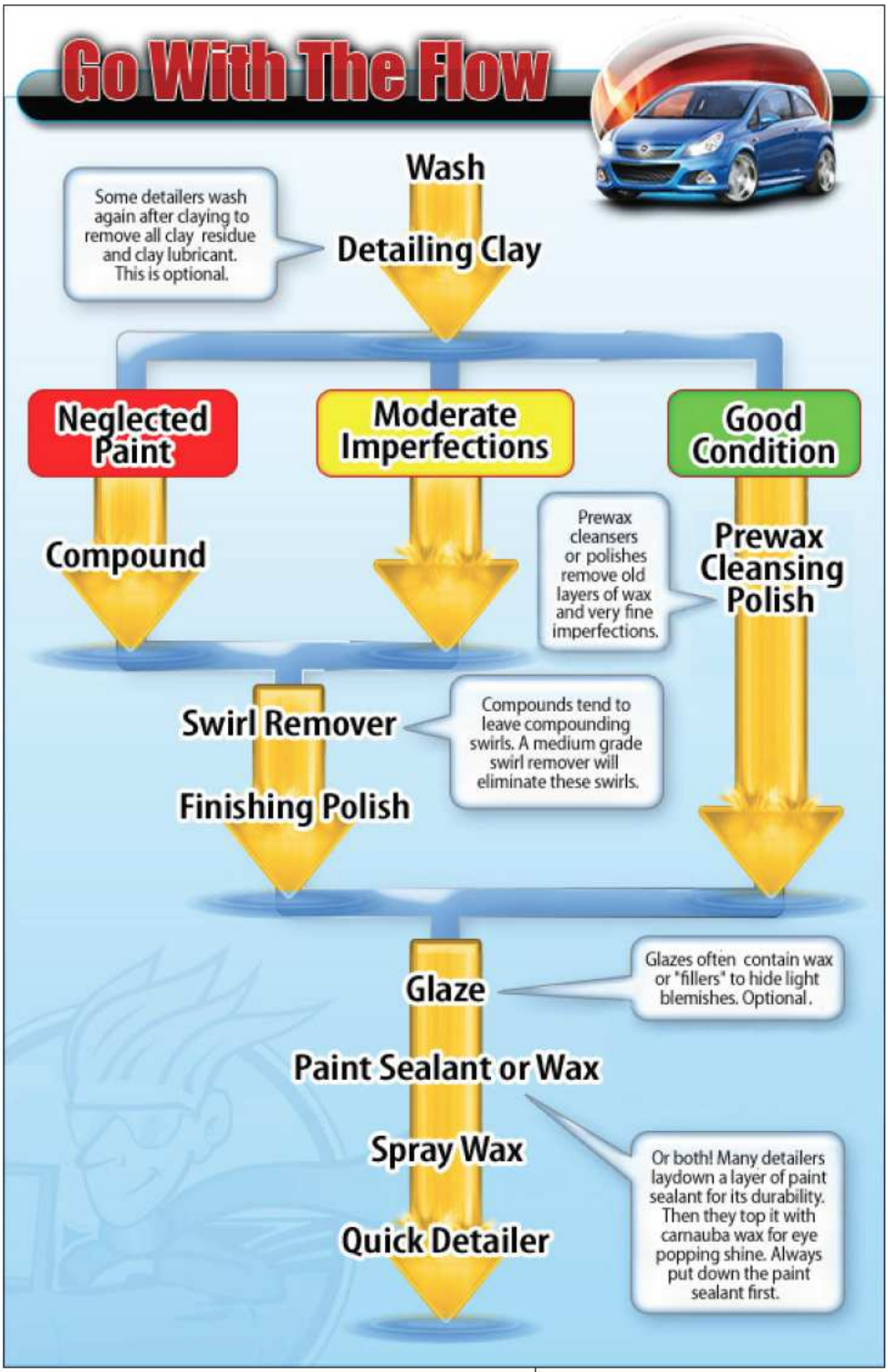
Cleaning Concerns

Before diving into the details of exterior car care, some background information on vehicle finishes and appropriate cleaning conditions is in order. This knowledge will help explain why, where, when and how certain operations should be performed.

Older car exteriors had a two-step finish consisting of a basic primer coat covered with a single heavy paint coat that dried to a glossy finish (enamel), or multiple thin paint coats that were then polished to achieve the final shine (lacquer). Almost all newer vehicles have a three-step finish that consists of an advanced primer coat that also protects against rust and corrosion, a base color coat with no shine, and an outer clear coat (sometimes tinted) that provides the glossy finish and has additives to protect against ultraviolet rays and environmental contaminants. Modern finishes provide an attractive and durable appearance, but clear coats do tend to show small scratches more than older paint finishes because light flows through and around any surface imperfections, "illuminating" them from all sides.

If there is any question about the type of finish on a car, rub a concealed area of the body with a white cloth (or black on a white car) and a mildly abrasive paint cleaner. If the car's color appears on the cloth, it has a two-step finish; if no pigment is transferred, a three-step clear coat finish is indicated.

A vehicle should never be washed or waxed in direct sunlight or high temperatures. Cleaning a car in the shade prevents water beads from magnifying sunlight and possibly harming the finish. Also, when the exterior surfaces of the car are hot, water and cleaners can dry very quickly, leading to mineral deposits or other paint damage. Cold temperatures are less of an issue, except in northern climates where a winter daytime car wash can lead to doors being frozen-shut after a sub-freezing night unless the jambs and seals are thoroughly dried.


Go With The Flow
Wash
Some detailers wash again after claying to remove all clay residue and clay lubricant. This is optional.
Detailing Clay
Neglected Paint
Moderate Imperfections
Good Condition
Compound
Prewax cleansers or polishes remove old layers of wax and very fine imperfections.
Prewax Cleansing Polish
Swirl Remover
Compounds tend to leave compounding swirls. A medium grade swirl remover will eliminate these swirls.
Finishing Polish
Glaze
Glazes often contain wax or "fillers" to hide light blemishes. Optional.
Paint Sealant or Wax
Spray Wax
Quick Detailer
Or both! Many detailers laydown a layer of paint sealant for its durability. Then they top it with carnauba wax for eye popping shine. Always put down the paint sealant first.

Steps a professional detailer may take to restore and protect a vehicle's paint finish.
Image: Autogeek

© 2016 American Automobile Association, Inc

Pre-Washing

Washing a vehicle removes surface contaminants that detract from appearance and over time can damage the paint. Before washing, open the doors, hood, sunroof, and trunk or hatchback and clear away any leaves, twigs or other debris around the openings. The underhood area at the base of the windshield is a common collection point. Follow up by using a microfiber towel wetted with a car washing detergent solution to wipe clean the normally hidden areas of these openings, along with any rubber seals and weather stripping.

This is also a good time to make sure the drain openings on the bottoms of doors and hatches are not blocked. These small holes allow any water that gets inside to escape, which helps prevent rust and corrosion. If any drains are blocked, clear them with a non-scratching tool, then flush the openings with low-pressure water from a hose until clear water runs freely from all of the drains.

Road tar thrown up by the tires can create a mess on a car's finish. *Image: Autogeek*

If the exterior paint has deposits such as road tar, tree sap or heavy bug splatter that are unlikely to come off with normal car wash detergent, now is the time to remove them using a microfiber cloth and a cleaning solution designed for this purpose. Kerosene works, and there are numerous aftermarket products for this task as well. Most are petroleum based and remove wax as well as deposits, so any affected areas will have to be rewaxed after washing is complete.

Washing

Common car washing tools include buckets, sponges, mitts and brushes. Better car wash buckets have a raised grid or "grit guard" in the bottom that allows dirt and other contaminants to settle out of the water, keeping them off sponges and mitts. When selecting washing tools, look for: large-pore, natural or synthetic sponges; soft synthetic or animal hair brushes; and wool, 100-percent cotton or microfiber wash mitts with a deep nap that will pick up dirt while being gentle on paint. Finally, always use automotive-specific washing products, not dishwashing detergent or other household cleaners that often contain chemicals and abrasives that can strip wax and damage paint or other parts.

Car wash buckets with grit guards, a wash mitt and cleaning brushes. *Image: Detailed Image*

Start by using a garden hose to rinse the vehicle with water from top to bottom, removing as much loose dirt as possible. Use a flood or soft spray of water; a focused jet or a pressure washer can force contaminants into and across the paint causing scratches. High-pressure water jets can also drive dirt into crevices where it can be difficult or impossible to remove.

Using the recommended mixture of car-wash detergent and water, soak the mitt/sponge and clean an area using back-and-forth strokes in a straight line. Start at the top and work down, one section of the body at a time. Rinse the surface of each panel as it is completed with a flood or soft spray of water, and clean the mitt/sponge of debris as well; professionals often use a second bucket of plain water for this purpose before starting on the next section. If a car is extremely dirty, it may be necessary to use more than one mitt and/or empty the detergent bucket partway through and refill it with fresh solution.

© 2016 American Automobile Association, Inc

When washing is complete, do one last rinse with water streamed nearly parallel to the body surfaces. This leaves the least moisture possible on the exterior, which helps reduce water spots and speeds drying. For professional detailers and hardcore car enthusiasts, rinse water mineral filtration and deionization units are available that help eliminate water spotting, even if the car is allowed to air dry. However, these units typically sell for $200 or more.

Drying

To prevent water spots a car should be dried immediately after washing. Drying tool options include blowers, squeegees, chamois and towels. A car-drying blower is similar to a vacuum cleaner being run in reverse; it uses a powerful stream of filtered air to clear water from the surface. Soft silicone-rubber squeegees designed for drying cars can quickly clear standing water from large smooth areas, but are less effective in other locations. While generally helpful, both these tools leave residual water that will require final drying with a chamois or towel. Some professionals also dislike them because they can force or drag dislodged contaminants across the paint surface.

Microfiber towels are excellent for lint-free drying of all vehicle surfaces. *Image: iStockphoto.com/RonFullHD*

Chamois is a soft, smooth leather originally made from hides of the Chamois, a goat-antelope species native to some mountains in Europe. Today, chamois is made from the hides of deer, goats, sheep and even pigs although, in the United States, the term *chamois* without qualification legally describes only sheep or lambskin tanned solely with oils. Chamois is extremely water absorbent and leaves no streaks, making it ideal for drying glass. However, professional detailers generally don't use chamois to dry paint because, like blowers and squeegees, it can drag abrasive particles across the surface.

Cotton towels are the traditional tool for drying cars because they will pick up and trap any remaining loose contaminants as the car is dried. Those used should be 100 percent cotton with a deep nap and soft, small fibers. Large-fiber, polyester-blend towels can scratch paint and should be avoided. If a towel lacks a fabric content tag, test it by holding a lighted match to one corner — if any portion of the fabric melts it contains polyester.

An increasingly preferred car drying option is microfiber towels, which are even better at capturing and containing loose debris, and leave no lint or dust. Microfiber comes in many forms; towels used for automotive cleaning should have deep split fibers for maximum absorbency and cleaning capability.

Dry the car from the top down, using a blower, squeegee or chamois if desired to quickly remove the bulk of the water. Follow up with cotton or microfiber towels to remove all remaining traces of water, paying special attention to the glass and mirrors to prevent spotting. Next, wipe down the insides of the door jambs, along with the hood and trunk or hatchback openings. Dry the wheels and tires last.

To prevent water spots a car should be dried immediately after washing. Drying tool options include blowers, squeegees, chamois and towels.

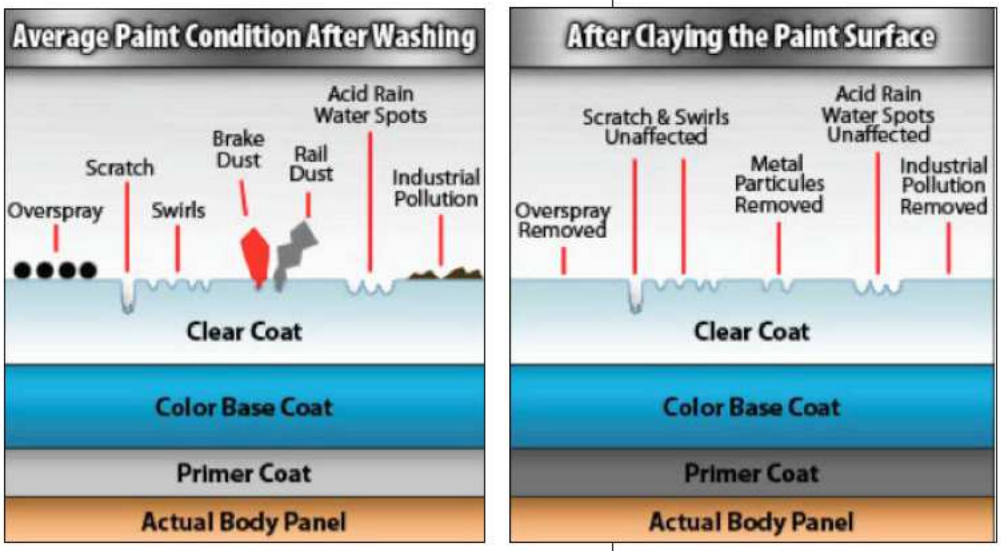
© 2016 American Automobile Association, Inc

Paint Restoration and Protection

Once a vehicle is washed and dried, the next step is typically wax application and removal. However, depending on the condition of the car's finish and the desired final appearance, a number of other operations may be performed both before and after waxing. These steps are not mandatory, and are primarily done by professional detailers. All of the different paint restoration and protection steps are shown in the flow chart on page seven, and described below in the order they are usually performed.

Clay Bar Deposit Removal

Many vehicles that appear clean after washing still have deposits on or in the paint. To determine if this is the case, insert a hand into a thin plastic bag and run it lightly over the paint, or gently slide the edge of a credit card across the surface. If the paint feels smooth or the card slides easily and quietly, move on to the next step. However, if the paint feels gritty or rough, or the card catches and makes noise as it moves across the surface, there are embedded contaminants that can be removed using a clay bar.



After washing, a clay bar can remove remaining contaminants from the finish.
Image: Autogeek

A clay bar is natural or synthetic putty that is rubbed across the paint using a lubricant recommended by the clay supplier. As this is done, the clay will trap and remove any foreign materials. When the bar slides smoothly without resistance, the surface is clean. As the bar gets dirty from use, it should be flattened and folded to expose a clean surface. Microfiber towels can be used to remove residual clay and lubricant from the paint, although some professional detailers rewash a car after using clay on it. Depending on the level of contamination, an average-size clay bar can be used on two to four cars before it must be replaced.

Trapped contaminants cause the clay to darken with use.
Image: Socal Mobile Auto Detail & Wash

Compounding

To restore a badly faded or oxidized vehicle finish, a power buffer and strong abrasive compounds can be used to remove the outer layer of damaged paint. This is an aggressive procedure that works best with a rotary buffer, can easily cut through the paint finish, and is best left to a professional.

The effectiveness of this process varies with the type of paint on the vehicle. Weathered enamel paint can be made to look better, but will never regain its full original luster once the original top surface has deteriorated. Lacquer and clear-coat paints can sometimes be completely restored, provided the outer finish is thick enough to allow damage removal without cutting through to the primer or color coat.

© 2016 American Automobile Association, Inc

Polish, Glaze and Paint Sealant

Polishes are mild abrasive cleaners that come in a variety of strengths for various needs. A car with a badly weathered finish that has been restored with buffing compound will typically have swirl marks in the paint. A swirl-removing polish would be used to remove these marks, followed by an even milder finishing polish that will leave the surface ready for the protective steps. These products can also be used as the starting point for restoring finishes that are only moderately deteriorated.

Even a car with a relatively good finish may have minor scratches and swirls in the outer surface. On these vehicles, a pre-wax cleaning polish will remove old wax, minor surface imperfections, light oxidation and water spots, leaving the finish ready for the next step.

For the ultimate vehicle finish, two additional processes can be performed before waxing the paint. First, apply a glaze, which is a final cleaner that typically contains wax or other "fillers" to conceal micro scratches in the paint surface. Then, apply a paint sealant that "locks in" the treatments to this point and makes the surface finish more durable and long lasting.

Car waxes offer an outer layer of protection against the environment, but they also provide the deep and vivid shine that makes a car stand out.

Wax and Detailing Spray

Car waxes offer an outer layer of protection against the environment, but they also provide the deep and vivid shine that makes a car stand out. Waxes come in paste, cream and liquid forms, and can be made of synthetic and/or natural ingredients. Many newer synthetic polymer waxes do an outstanding job and are often easier to apply and remove. However, some professionals maintain that nothing can beat the hardness and shine of natural carnauba wax, although it is more challenging to work with.

Apply a thin coat of wax, allow it to dry, then wipe off the haze with a clean towel. *Image: Mothers Polish*

Never wax a vehicle in direct sunlight or high temperatures, and always apply the product to a towel or applicator pad and then to the vehicle finish; pouring liquid waxes directly onto the paint can cause streaking or an uneven finish. Work on one section or body panel at a time. Apply mild pressure, and switch to a new clean section of towel or pad frequently. A light coat of wax is just as effective as a heavy application, and much easier to remove. Let the wax dry to a haze then rub it off using a clean cotton or microfiber towel. Small, soft-bristle detailing brushes can be used to remove wax residue from difficult to reach areas such as around logos, emblems and trim.

Interim Cleaning

In between periodic washing and waxing, pollen and dust particles that collect on the finish can be wiped away using a cotton car duster. For added protection, and to help maintain the finish, this can be followed up with liquid wax or "quick detailer" that is sprayed on and wiped off with a cotton or microfiber towel. The chemicals in these cleaners help lift contaminants off the surface so they can be safely removed. Similar products are available for "waterless" car washing in winter climates or areas that have water use restrictions in effect.

© 2016 American Automobile Association, Inc

Body Trim Care

Body trim is not just decorative, it includes functional components such as bumpers, handles, and seals for windows and doors. If not properly cared for, the trim will become dirty, worn or damaged, which detracts from appearance and may even interfere with proper vehicle operation.

The trim material will dictate how it is cleaned. A damp rag is often sufficient, and a mild car wash detergent solution and soft brushes can help remove more stubborn deposits. Chemical cleaners should be used with caution; a product intended for cleaning one type of trim may cause permanent damage to others. Always carefully read and follow the directions on trim cleaning solutions.

Plastic trim – A good portion of every vehicle is made from some form of plastic, and exterior trim made of these materials is often the first to weather and deteriorate. Once the surface is washed and dried, apply a suitable cleaner/protectorant that shields against UV light.

Rubber trim – Rubber trim pieces serve as bumpers and moldings that are used to protect and seal windows, doors and other components. When not maintained, rubber trim will look chalky, get stiff and brittle, and eventually crack or tear. Once the surface is clean and dry, use a cloth to apply a rubber restoration or protective dressing. Never spray aerosol protectorants directly onto rubber components as some propellants can cause damage. With door seals, make sure the body surfaces they contact are smooth and clean as well.

Black trim – Black trim (other than rubber parts) is usually plastic, anodized aluminum or painted metal. When the surface is dry, treat the part with an appropriate protectorant designed for the part's finish, generally either matte or gloss. Special cleaners and dyes are available to restore black trim that has a faded or chalky appearance. Some newer polymer waxes can also be used to treat and protect black trim, but make sure the product label recommends such use.

Metal trim – Metal trim can be chrome, aluminum, or stainless steel. Use a polish specifically made for the material, and apply with a soft cloth. If chrome trim develops minor rust spots, they can often be removed with polishing compound or, in the hands of a professional detailer, extra-fine steel wool.

Headlight lenses – Use special care when cleaning polycarbonate plastic headlight lenses because they scratch easily. If the lenses are clouded or hazy, they can be restored using a do-it-yourself kit from an auto parts store, or by taking the car to a headlight restoration specialist. Either way, the final step should be application of a protective coating to seal and protect the refinished surface.

Body Repair and Protection

Over time, cars can suffer minor defects in their finishes due to road debris or careless actions by owners and other motorists. Fortunately, for those who like to keep their vehicles looking like new, there are ways to repair or prevent certain kinds of damage at relatively moderate costs. Some are do-it-yourself options, but in many cases the services of a professional will provide better results.

Body trim is not just decorative, it includes functional components such as bumpers, handles, and seals for windows and doors. If not properly cared for, the trim will become dirty, worn or damaged, which detracts from appearance and may even interfere with proper vehicle operation.

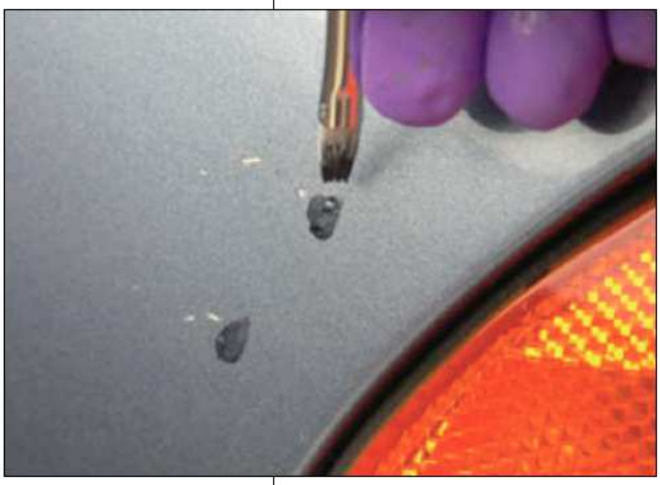
© 2016 American Automobile Association, Inc

Paint Scratches and Chips

Paint damage is an automotive fact of life. Scratches can happen in any number of ways, while chips are usually caused by stones thrown up by other traffic. If the damage penetrates the primer, it will lead to rust and corrosion unless properly treated. Minor surface scratches can often be buffed or polished out, but more significant damage generally requires panel repair at a body shop.

Small chips can be filled in using touch-up paint available at car dealers and also at auto parts and other stores. Newer cars may require a two-step color and clear coat process. Clean the damaged area per the paint supplier's instructions, then apply paint in several thin layers to fill the chip. Some kits include ultra-fine abrasive paper to remove excess paint, after which the repair is completed by waxing or applying a clear coat, depending on the vehicle finish.

If the front of a car is badly chipped, talk with a car dealer or professional detailer about alternative repair options that can provide a more satisfactory finished appearance. There are companies that routinely repair this type of damage for auto dealers using special procedures and equipment.



Using a fine brush to apply touch-up paint is the first step in repairing chips. *Image: Autogeek*

Metal Dents and Dings

Door dings and small dents can often be fixed using paintless dent repair (PDR), a process in which a skilled technician gains access to the backside of the dent and then uses special tools to "massage" the metal back to its original position. PDR is not a viable option if: a dent is too large or located where the backside is inaccessible; the paint is damaged; the panel is creased; or the metal has been stretched beyond its "memory" point.

Done right, a panel repaired with PDR will look completely original with no indication there was ever a dent. However, PDR is more art than science, which makes it a poor do-it-yourself project. Instead, shop carefully for a skilled provider who has excellent reviews and recommendations.

Body Protection

Numerous products are available to help protect a vehicle's exterior from damage and contaminants. A car cover works great for parked vehicles because it keeps most everything off the paint while also shielding the finish and interior from sunlight. Just be sure to get a cover that "breathes" so moisture doesn't accumulate underneath where it can cause mold, mildew, rust and corrosion.

For cars often driven on the highway, a plastic "bug shield" that mounts at the front edge of the hood will protect the paint and may help deflect air, insects and small stones up and over the windshield. These are most commonly seen on pickup trucks and sport utility vehicles.

A vinyl car "bra" with a padded backing can also protect the front of the car from bugs and rock chips. However, proper fit is essential to ensure the bra does not flap or vibrate at highways speeds, which will damage the vehicle finish. Dirt and moisture that accumulate under the bra can also cause problems, so regular removal and cleaning is recommended.

© 2016 American Automobile Association, Inc

A comprehensive protective paint film kit. *Image: ClearMask*

One of the newest technologies in vehicle finish protection is the application of a transparent urethane vinyl film, or "clear bra," on the front of the vehicle and other common impact areas. Custom cut kits are available for popular models, but installation can be tricky and may require the application of heat to make the material properly conform to the body shape. Professional application of clear bras is highly recommended, and a trained installer can also custom cut raw material to fit special areas and less common vehicles.

Finally, auto parts and other stores sell a variety of protective products, including door edge films, moldings and bumpers that protect against chips and nicks. Bumpers are also available to install on garage walls where a car door might make contact. To protect against careless actions by other vehicle owners, rubber protectors for the sides, corners and bumpers of the car are available as both original equipment and aftermarket parts. There are even models for temporary use that attach with magnets, straps and security cables to prevent theft.

Interior Cleaning

The soft seats, sleek instrument panels, luxurious carpeting and sparkling trim that make a vehicle interior a nice place to spend time won't stay that way if they are not cleaned on a regular basis. Common interior cleaning tools and products include: a vacuum; brushes and towels; stain removers, cleaners and conditioners specific to various materials; and air fresheners.

Vacuuming and Dusting

Interior cleaning begins with removing all loose items from the car. Empty trash bags and ash trays, clean out the glove compartment and other storage bins, and remove the floor mats. Then, use a vacuum with hose extensions and attachments to thoroughly clean the floor mats and interior carpet. Sliding seats to the front and back of their tracks will provide easier access to the areas underneath. And, in mini-vans and sport utility vehicles, folding the rear seats or removing quick-release models can improve access as well.

A stiff bristle brush can help remove dried on mud and other carpet deposits. Pay special attention to the driver's footwell and areas around floor mats where dirt tends to collect and acts like sandpaper to breakdown the carpet fibers and backing.

The soft seats, sleek instrument panels, luxurious carpeting and sparkling trim that make a vehicle interior a nice place to spend time won't stay that way if they are not cleaned on a regular basis.

© 2016 American Automobile Association, Inc

While in the driver's footwell, clean the pedal pads with a cloth wetted in a car wash solution. Replace any pads that are worn smooth, or to the point where the underlying metal pedal is exposed. Never use silicone-based protectorants on foot pedals as the resulting slick finish could cause a shoe to slip off a pedal, possibly resulting in a crash.

Next, vacuum the upholstery, focusing on seams where debris collects that will damage the stitching over time. Don't overlook the areas between seat bottoms and back cushions which trap and conceal all sorts of things. Recline the seatbacks and raise the headrests for access to normally concealed areas. Suck up any debris from the glove compartment and storage bins, then use a soft detailing brush to help clean dust from ventilation ducts and grilles

A detailing brush helps remove dust from ventilation ducts and other hard-to-reach areas. *Image: Autoglym*

Detailing brushes can also be used to help clean and vacuum away debris from small grooves and crevices on the instrument panel and elsewhere throughout the car. Using the vacuum in "blow" mode is another technique for getting dirt and crumbs out of hard to reach areas. Finally, if other interior surfaces are particularly dirty, use a vacuum with a brush attachment to remove as many of the loose deposits as possible.

Carpet and Upholstery Cleaning

Carpets that are in generally good condition, but have localized stains, can be cleaned by spraying a suitable detergent solution on the spots, using a brush to work it in, then rubbing with a towel to remove the stain and cleaner. Cleaning dirtier areas, particularly floor mats and cargo area carpeting, may require the use of a carpet "steam" cleaner equipped with a hand-held attachment.

Cloth upholstery is cleaned in much the same manner as carpets. However, care should be taken to not use too much cleaning solution, which can soak into seat padding and foam cushions, increasing drying times. Upholstery fabrics can be sensitive to different cleaners, so be sure to test the product in a small hidden location before using it on major surfaces.

A "steam" (water extraction) carpet cleaner can be used to remove heavy stains. *Image: Auto Detail Doctor*

To avoid mold and mildew, allow damp carpet and upholstery to dry completely before reinstalling the floor mats or other coverings. To help speed drying, leave the doors or windows open, park the car in the sun and/or use an electric fan to circulate air inside the car.

Vinyl upholstery can usually be cleaned with a damp rag, or one wetted with a mild detergent solution. Dedicated vinyl care products are also available that combine cleaners, conditioners, preservatives and UV protection.

© 2016 American Automobile Association, Inc

Stained and worn leather upholstery is usually treated in two steps. First, saddle soap or another type of leather cleaner is used to remove dirt and other deposits, then a conditioner/preservative is applied to restore natural oils that keep the leather pliable and protect it against heat, light and stains. This product may need to be left on the leather for some time so it can be absorbed, then any excess is buffed off. One-step leather cleaners and conditioners are also available for more routine seat care.

Applying cleaning solution to a leather car seat. *Image: Auto Detail Doctor*

Upholstery Repair

There are a number of repair options for damaged upholstery. Scuffs and scratches in leather can be concealed by touching them up with a matching color of leather cream or shoe polish. Be sure to thoroughly buff clean the treated area to prevent clothing from being stained. Small tears in cloth upholstery can be stitched closed to keep them from getting larger, and small cuts in vinyl or leather seats can be glued closed using special kits and materials available at auto parts and other stores.

More significant upholstery damage or weathering may require professional replacement of seat fabric or redying of leather. Auto parts stores often sell aerosol upholstery "dyes," but these are typically just thick, flexible paints that provide mixed results and limited durability. When considering anything more than a simple seat repair, discuss the options with a professional detailer or auto upholstery shop.

Other Surface Cleaning

Most vehicle interior surfaces other than carpets and upholstery can be cleaned with a damp towel or, for more significant stains, one wetted with a mild detergent solution. However, it is best to check the owner's manual for automaker recommendations instructions before cleaning out-of-the-ordinary surfaces such as suede, Alcantara® (synthetic suede), "mouse fur" headliners, etc. Once dry, interior surfaces can be treated with a protectorant designed for the specific material. Products for vinyl and leather upholstery can also be used on other such surfaces inside the car.

When selecting interior protectorants, professional detailers use products that preserve the original factory finish, which usually has a natural matte or satin appearance. They generally avoid silicone-based protectorants that leave a shiny, "greasy" finish that tends to attract dust and, when applied to the top of the dash, creates windshield reflections that can interfere with driver vision. Household furniture polish is good for cleaning and protecting glossy wood trim, but newer matte-finish, open-pore wood trim should only be treated with a product recommended by the vehicle manufacturer.

To prevent streaking and uneven results, protectorants should be sprayed or poured onto a towel or other applicator, which should then be used to apply the solution to the interior components. Be sure to use clean towels and applicators for each new protectorant to prevent cross contamination.

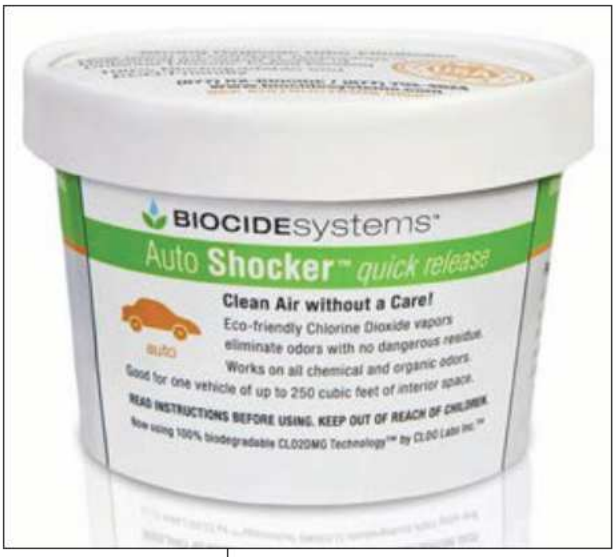
When selecting interior protectorants, professional detailers use products that preserve the original factory finish, which usually has a natural matte or satin appearance.

© 2016 American Automobile Association, Inc

Odor Elimination

Many car washes offer a selection of interior scents as part of their services. These are usually just "perfume" sprays that are applied to the carpeting. Similar products are available at auto parts stores, along with a variety of other air fresheners such as infused paper pads, electric diffusers that plug into a power outlet, and strips or modules that clip onto ventilation duct grilles.

For tougher smells, there are spray-on liquid treatments such as Febreze that chemically bond with odor-causing particles to neutralize them. A similar, but more powerful, option is a one-time-use "odor bomb" that is discharged in a closed car and disperses an odor-killing fog that permeates the interior and works over a period of hours.


BIOCIDEsystems
Auto Shocker™ quick release
Clean Air without a Care!
Eco-friendly Chlorine Dioxide vapors eliminate odors with no dangerous residue.
Works on all chemical and organic odors.
Good for one vehicle of up to 250 cubic feet of interior space.
READ INSTRUCTIONS BEFORE USING. KEEP OUT OF REACH OF CHILDREN

A chlorine dioxide odor mitigation "bomb." *Image: Biocide Systems*

Finally, there are persistent odors that have become trapped in the carpet, upholstery and headliner — things such as smoke, mold, mildew, sour milk and pet "accidents." Eliminating these odors is a job for a professional detailer who will place an ozone generator in the vehicle interior and let it run for an extended period. Ozone (O3) is a highly-reactive, oxygen-rich molecule that quickly bonds with odor-causing bacteria, spores and microorganisms. As it does so, the additional oxygen chemically alters the structure of those molecules, eliminating the smells.[5]

Glass Cleaning

Auto glass becomes coated with all manner of contaminants: dirt, pollen, bugs, tree sap, road tar and even detergents and waxes sprayed on by automatic car washes. All of these affect driver vision to some degree, and wax build up on the windshield can interfere with proper operation of the windshield wipers, causing them to skip, chatter or leave behind micro-beads of water that can interfere with driver vision.

The scrubbing pad on the backside of a squeegee can help remove many windshield deposits. *Image: iStockphoto.com/AndreyPopov*

Many deposits can be removed with a mild detergent solution and a foam-backed nylon mesh pad — such as those found on gas station window-cleaning squeegees. Bugs, tree sap and road tar can be removed with appropriate cleaners and towels. Final cleaning should be done with an automotive glass cleaner that does not contain ammonia, which can damage rubber, vinyl, leather, plastic and aftermarket window tints. Microfiber or soft cotton textured "waffle cloth" towels work best for cleaning and drying glass without streaking.

On more weathered windshields, special pre-cleaners can help remove stubborn deposits and wax buildup. Debris can also be removed by using a clay bar on the glass, or by scrubbing the windshield with a non-abrasive cleaning powder such as Bon Ami or Bar Keepers Friend. When a windshield is totally clean, water sheets on the surface rather than beading up. This provides optimum windshield wiper operation, provided the rubber blades are clean and in good condition.

© 2016 American Automobile Association, Inc

Cleaning the exterior of other vehicle windows is usually straightforward and requires nothing more than the use of a cleaner that does not contain ammonia. Some detailers wax the exterior of the side and rear windows to help protect them from hard water stains.

The main contaminant encountered when cleaning the insides of car windows is a haze or film caused by smoke and/or the release of "plasticizers" that keep upholstery and other vinyl parts flexible. A non-ammonia glass cleaning solution will remove these deposits, but care should be taken to keep it off other interior surfaces where it may cause spots or damage. Special cleaning wands that make it easy to reach the lower portions of the windshield and rear window are well worth their nominal cost.

A wand with a microfiber pad makes interior windshield and back window cleaning much easier. *Image: Bavarian Autosport*

Aftermarket tinting on the inside of windows can be cleaned with a non-ammonia glass cleaner. Look for words such as "safe for tinted windows" on the package. For optimum clarity, special products are available at auto parts and other stores to clean and seal aftermarket window tint films.

Glass Coatings

Some drivers like to treat the outside of their windshields with water repellants such as RainX, Rain Clear, Aquapel and others. These solutions chemically bond with the windshield surface, causing water to bead up and roll off more easily. Water repellents reduce the need to use windshield wipers, particularly at highway speeds, and can last for months. However, some users claim they can cause wiper blades to chatter, or leave micro-beads of water on the glass when the wipers are used, which can interfere with driver vison. Inside the car, anti-fog coatings can be applied to the windshield and rearview mirror to reduce or prevent fogging.

Chip repair can be a cost-effective alternative to windshield replacement. *Image: GlasWeld*

For best results, the surface of the windshield should be completely clean before applying water repellant and anti-fog solutions. Follow the manufacturer's instructions carefully. In some cases, multiple applications are recommended for best performance.

© 2016 American Automobile Association, Inc

Glass Repair

Windshield "bullseye" rock chips can usually be repaired by injecting polymer resin into the damaged area, and then smoothing the surface to make the imperfection practically invisible.[6] Such repairs not only improve clarity, they can prevent a chip from turning into a crack, which may require windshield replacement. For this reason, some auto insurance companies cover glass repair with no deductible. However, glass repair is not usually recommended when the damage is in the driver's line of sight as even small fixes can create minor distortions that affect visibility and safety.

Do-it-yourself glass repair kits can be purchased at auto parts and other stores, but professional glass repair technicians have special training and equipment that usually provide a better outcome. They use vacuum pumps to evacuate air and debris from the damaged area, and may even drill an opening to aid in this process. They also have special tools for the repair of small cracks, and use advanced resins that sometimes require curing with ultraviolet light.

Windshield micro-pits are caused by airborne debris striking the glass at high speeds. *Image: Autogeek*

Glass Polishing

Over time, most windshields develop small white spots called micro-pits from sand and debris hitting the glass at high speed. Windshields can also be scratched by the metal frames of badly worn wiper blades. These types of damage can be removed or minimized using a power buffer and special glass polishing pads and compounds available at auto parts and other stores. However, this is a time- and labor-intensive process that requires special precautions to prevent damage to the glass and adjacent vehicle surfaces. Most glass professionals recommend windshield replacement rather than polishing unless the glass is unavailable or prohibitively expensive.

Endnotes

1 How to detail your car and give it a makeover, *Consumer Reports*, http://bit.ly/1ZL86tx

2 http://bit.ly/1tsgUe3

3 www.wheelcollision.com/wccmtd.html

4 www.rimrenew.com/faq.html

5 Ozone Solutions, *How does ozone remove odors*, www.ozonesolutions.com/journal/2009/how-does-ozone-remove-odor

6 Should You Repair It or Replace It? *MSN Autos*, http://editorial.autos.msn.com/article.aspx?cp-documentid=435992

© 2016 American Automobile Association, Inc

To Learn More

DETAILING GUIDES

3M – Detailing Manual System
http://bit.ly/1rlKCze

Autoglym Car Care Guide
http://bit.ly/1o2w6l1

Best Auto Detailing Tips
www.best-auto-detailing-tips.com

Detailed Image – Auto Detailing Guide
www.detailedimage.com/guide/AutoDetailingGuide.pdf

Detail Supply Outlet – Professional Detailing Manual
www.detailsupplyoutlet.com/pdf_files/educational_lit.pdf

Furious Shine – Ultimate Detailing Guide
www.furiousshine.com/FuriousShineUltimateDetailingGuide.pdf

Griot's Garage – Detailer's Handbook
http://bit.ly/1rlK0K6

James – Guide to Detailing & Customizing
www.guidetodetailing.com/detailing-101/detailing-treating-trim

Meguiar's – Detailing Guide
http://bit.ly/1ULHEOX

Mothers – Detail Guide
www.valleyvettes.ca/technical/Mothers_DetailGuide_0_All.pdf

MEDIA SITES

Angie's List – Car Washes and Auto Detailing
www.angieslist.com/research/car-washes-and-auto-detailing

Car Talk – Car Cleaning Tips from a Pro
www.cartalk.com/content/car-cleaning-tips-pro-4

Popular Mechanics – 10 tips to clean and detail your car like a pro
http://bit.ly/1yUyq69

Consumer Reports – Car Wax Buying Guide
www.consumerreports.org/cro/car-wax/buying-guide.htm
http://bit.ly/1ZL86tx

Edmunds – How to clear foggy headlights
www.edmunds.com/how-to/how-to-clear-foggy-headlights.html

For Dummies – How to Touch Up Your Car's Paint Job
http://bit.ly/1gtZo0B

Car Cleaning Guru – Underbody Cleaning
www.carcleaningguru.com/underbody-cleaning

PROFESSIONAL SITES

Car Brite
www.carbrite.com

Detail King
www.detailking.com
www.detailking.com/landing-pages/ozone-generators

Dent Wizard
www.dentwizard.com
http://bit.ly/1OlpVi7

International Detailing Association
www.the-ida.com

Ziebart
www.ziebart.com

DETAILING SUPPLY SITES

3M – Car Care Products
www.3mauto.com

3M – Paint Protection Film
http://bit.ly/1YlXouH

Aquapel
www.aquapel.com

Autogeek
www.autogeek.net

Autoglym
www.autoglym.com

Autopia Car Care
www.autopia-carcare.com

Biocide Systems
www.biocidesystems.com

Black Magic
www.blackmagicshine.com

Chemical Guys
www.chemicalguys.com

ClearMask
www.clearmask.com

Detailed Image
www.detailedimage.com

Eagle One
www.eagleone.com/products

Glass Science
www.glassscience.com

GlasWeld
www.glasweld.com

Griot's Garage
www.griotsgarage.com

HandStands/Lexol
www.handstands.com

Liquid Glass
www.liquidglasspolish.com

Meguiar's
www.meguiars.com

Mothers
www.mothers.com

Nu Finish
www.nufinish.com

RainX – Glass Water Repellent
www.rainx.com

Simoniz USA
www.simoniz.com

Swissvax
www.swissvax.us

Swissvax – Detailing Video
http://bit.ly/25XHdpX

Turtle Wax
www.turtlewax.com

Wolfgang Car Care
www.wolfgangcarcare.com

Zymöl
www.zymol.com

© 2016 American Automobile Association, Inc